

Cryogenic Rotary Piezoelectric Motor, Phase I

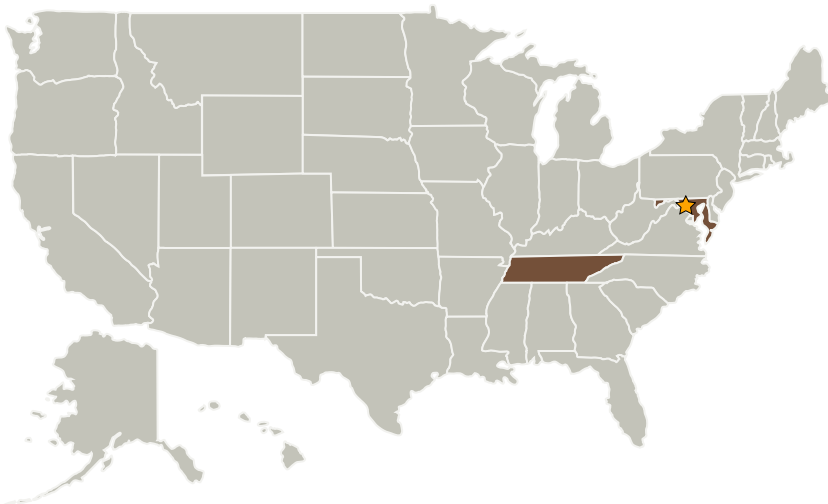
Completed Technology Project (2008 - 2008)



Project Introduction

Piezoelectric motors operate on the principal of high frequency oscillation of high force precision ceramic elements. The high power oscillations are converted to rotary motion through a novel conversion mechanism to produce high torque precision motion when compared with traditional electromagnetic motors. Dynamic Structures and Materials (DSM) proposes to focus the Phase I innovation on the development and design of a precision rotary conversion mechanism that will take the piezoelectric oscillatory power and produce rotary motion for operation at cryogenic and extreme environments. DSM has already demonstrated operation of its high force linear motor actuators for environments as low as 77 K. The proposed rotary motor should operate from approximately 25K to 400 K and should provide very low or no outgassing as well as operational capabilities in hard vacuum. The technology is proposed for applications in the area of rover control, driving operational equipment, instruments, and other such facilities. This proposal addresses DSM's perceived approach to the development of flight-scalable demonstration components for the novel rotary motor technology.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Dynamic Structures and Materials, LLC	Supporting Organization	Industry	Franklin, Tennessee

Primary U.S. Work Locations

Maryland	Tennessee
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Jeffrey Paine

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.1 Power Generation and Energy Conversion
 - └ TX03.1.5 Electrical Machines